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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/001,909	10/31/2001	Luigi Occhipinti	851763.417	9099

500 7590 10/21/2004

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EXAMINER	
AKHAVANNIK, HUSSEIN	
ART UNIT	**PAPER NUMBER**
2621	

DATE MAILED: 10/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/001,909	OCCHIPINTI, LUIGI	
	Examiner	Art Unit	
	Hussein Akhavannik	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☒ Claim(s) *6,8,9,18 and 19* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 October 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to because figures 1, 5, 7, and 8 do not contain descriptive labels. For example, reference number 3 in figure 1 should be labeled "airbag" and reference number 21 in figure 5 should be labeled "CCD".

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: Reference number 13 in figure 2 is cited on page 6, line 26, but is not present in figure 2.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities:

On page 6, line 16, "analogue" should be changed to "analog".

On page 9, line 18, "analogue" should be changed to "analog".

Appropriate correction is required.

Claim Objections

4. Claims 6, 8-9, and 18-19 are objected to because of the following informalities:

In claim 6, line 2, "analogue" should be changed to "analog".

In claim 8, lines 2 and 3, "analogue" should be changed to "analog".

In claim 9, line 10, "and" should be added after the comma.

In claim 18, line 18, "and" should be added after the comma.

In claim 19, line 18, "and" should be added after the comma.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 9, and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Breed et al (U.S. Patent No. 6,712,387).

Referring to claim 1,

i. An array of photo sensitive elements for acquiring images of a passenger compartment is explained by Breed et al in column 7, lines 16-30, wherein a CCD/CMOS is used to receive images from an occupant of a vehicle. A CMOS device is inherently composed of an array of photosensitive elements. Breed et al explain that the side airbag corresponds to the passenger compartment in column 5, lines 24-28.

ii. A circuit for processing the signals corresponding to the images generated by the photosensitive elements is illustrated by Breed et al in figure 7B by the application specific integrated circuit (ASIC) which receives the output of the transducers 131 and 133 (CMOS devices).

iii. The processing circuit configured according a cellular neural network processing architecture of the image signals is explained by Breed et al in column 12, lines 46-64.

iv. The processing circuit adapted to generate, as a function of the image signals, an output signal indicating the deployment modalities of the airbag to which the sensor is associated is explained by Breed et al in column 7, lines 38-43.

Referring to claim 9, the processing circuit is configured to carry out at least one of the following operations: thresholding, noise reduction by smoothing, cumulative difference calculating between images or ADI, contour imaging, noise reduction by small object deletion, contour closing, closed contour filling, diagonally connected contour imaging, and movement speed detection of an object in said images is explained by Breed et al in column 14, lines 55-59, wherein the movement speed of an occupant is determined from the images.

Referring to claim 18,

i. An array of photosensitive elements for acquiring images of a passenger compartment of a motor vehicle corresponds to claim 1i.

ii. A processing circuit coupled to the array of photosensitive elements and configured to receive signals generated by the photosensitive elements that correspond to images of the passenger compartment corresponds to claim 1ii.

iii. The processing circuit configured according to a cellular neural network processing architecture corresponds to claim 1iii.

iv. The processing circuit adapted to generate, as a function of the image signals generated by the photosensitive elements, at least one output signal indicating the deployment modalities of the airbag corresponds to claim 1iv.

v. The processing circuit is configured to carry out at least one of the following operations: thresholding, noise reduction by smoothing, cumulative difference calculating between images or ADI, contour imaging, noise reduction by small object deletion, contour closing, closed contour filling, diagonally connected contour imaging, and movement speed detection of an object in said images corresponds to claim 9.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 2-8 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breed et al in view of Dominguez-Castro et al (Dominguez-Castro, R.; Espejo, S.; Rodriguez-

Vazquez, A.; Carmona, R.A.; Foldesy, P.; Zarandy, A.; Szolgay, P.; Sziranyi, T.; Roska, T.; "A 0.8-μm CMOS two-dimensional programmable mixed-signal focal-plane array processor with on-chip binary imaging and instructions storage," IEEE Journal of Solid-State Circuits, Volume: 32, Issue: 7, pp. 1013-26, July 1997).

Referring to claim 2, the array of photo sensitive elements and the processing circuit being comprised in a single integrated component is not explicitly explained by Breed et al. However, Dominguez-Castro et al illustrate the array of photo sensitive elements and the processing circuit being comprised in a single integrated component in figure 1. Dominguez-Castro et al explain that these single integrated components allow either linear or nonlinear processing in real-time on page 1013, second column, first full paragraph. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to integrate the array of photo sensitive elements and the processing circuit, as suggested by Dominguez-Castro et al, in the system of Breed et al because the image processing would be performed in real-time.

Referring to claim 3, the cellular neural network comprising a plurality of cells each associated with a respective photo sensitive element of said array is not explicitly explained by Breed et al. However, Dominguez-Castro et al explain a photo sensitive element being associated with a cell on page 1013, second column, second full paragraph (continued on page 1014). The photosensitive elements are configured in this arrangement in order to connect each element with its respective cell, thereby allowing parallel processing on the chip. Dominguez-Castro et al explain that these single integrated components allow either linear or nonlinear processing in real-time on page 1013, second column, first full paragraph. Therefore, it would

have been obvious to one of ordinary skill in the art at the time the invention was made for the cellular neural network to comprise a plurality of cells each associated with a respective photo sensitive element of said array, as suggested by Dominguez-Castro et al, in the system of Breed et al because the image processing would be performed in real-time.

Referring to claim 4, the cells and respective photo sensitive element being implemented in separate islands in a CMOS technology well is not explicitly explained by Breed et al. However, Dominguez-Castro et al illustrate that the cells and the photo sensitive elements are implemented in separate islands in a CMOS technology well in figure 10a. The photosensitive elements are configured in this arrangement in order to connect each element with its respective cell, thereby allowing parallel processing on the chip. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made for the cells and respective photo sensitive element being implemented in separate islands in a CMOS technology well, as suggested by Dominguez-Castro et al, in the system of Breed et al because CMOS technologies allow either linear or nonlinear processing in real-time (as explained by Dominguez-Castro et al on page 1013, second column, first full paragraph).

Referring to claim 5, the photo sensitive elements comprising a coupling area between a bulk and a CMOS technology well forming the photo sensitive area is not explicitly explained by Breed et al. However, Dominguez-Castro et al explain photo sensitive elements comprising a coupling area between a bulk and a CMOS technology well on page 1020, section V (optical interface circuitry) and illustrate the optical sensor in figure 10a. The photosensitive elements are configured in this arrangement in order to connect each element with its respective cell, thereby allowing parallel processing on the chip. Therefore, it would have been obvious to one

of ordinary skill in the art at the time the invention was made for the photo sensitive elements to comprise a coupling area between a bulk and a CMOS technology well, as suggested by Dominguez-Castro et al, in the system of Breed et al because CMOS technologies allow either linear or nonlinear processing in real-time (as explained by Dominguez-Castro et al on page 1013, second column, first full paragraph).

Referring to claim 6,

i. At least one analog memory for storing image data by photo sensitive elements of said array is not explicitly explained by Breed et al. However, Dominguez-Castro et al explain an analog memory on page 1019, first column, second full paragraph.

ii. A control logic for executing real-time image processing sequences in said cellular neural network is not explicitly explained by Breed et al. However, Dominguez-Castro et al explain that the CNN chips allow image processing in real-time on page 1013, second column, first full paragraph. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to store image data of the photo sensitive elements in an analog memory and execute real-time image processing sequences, as suggested by Dominguez-Castro et al, in the system of Breed et al because the image processing would be performed in real-time, allowing faster operation of the airbag.

Referring to claim 7, the processing circuit comprising means for storing configuration parameters for said cellular neural network is not explicitly explained by Breed et al. However, Dominguez-Castro et al explain on-chip memories for internal storage of instructions on page 1014, first column, first full paragraph. Dominguez-Castro et al explain that the CNN chips

allow image processing in real-time on page 1013, second column, first full paragraph. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to store configuration parameters for said cellular neural network, as suggested by Dominguez-Castro et al, in the system of Breed et al because the image processing would be performed in real-time.

Referring to claim 8, the configuration parameters being stored in digital form and the processing circuit comprising a digital-analog converter for converting said parameters in analog format in view of being supplied to said cellular neural network is not explicitly explained by Breed et al. However, Dominguez-Castro et al explain that the internal CNN control is analog while the coefficients are codified and stored in digital form on page 1015, first column, forth full paragraph. Furthermore, Dominguez-Castro et al illustrate D/A converters for generating analog weight signals from their digitally encoded values in figure 3 and explain the converters on page 1016, second column, first full paragraph. Dominguez-Castro et al explain that the CNN chips allow image processing in real-time on page 1013, second column, first full paragraph. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made for the configuration parameters being stored in digital form and the processing circuit comprising a digital-analog converter for converting said parameters in analog format, as suggested by Dominguez-Castro et al, in the system of Breed et al because the image processing would be performed in real-time.

Referring to claim 16,

i. An array of photosensitive elements for acquiring images of a passenger compartment of a motor vehicle corresponds to claim 1i.

ii. A processing circuit coupled to the array of photosensitive elements and configured to receive signals generated by the photosensitive elements that correspond to images of the passenger compartment corresponds to claim 1ii.

iii. The processing circuit configured according to a cellular neural network processing architecture corresponds to claim 1iii.

iv. The processing circuit adapted to generate, as a function of the image signals generated by the photosensitive elements, at least one output signal indicating the deployment modalities of the airbag corresponds to claim 1iv.

v. At least one analog memory configured to store image data corresponding to the images generated by the photo sensitive elements corresponds to claim 6i.

vi. A control logic for executing real-time image processing sequences in said cellular neural network corresponds to claim 6ii.

Referring to claim 17,

i. An array of photosensitive elements for acquiring images of a passenger compartment of a motor vehicle corresponds to claim 1i.

ii. A processing circuit coupled to the array of photosensitive elements and configured to receive signals generated by the photosensitive elements that correspond to images of the passenger compartment corresponds to claim 1ii.

iii. The processing circuit configured according to a cellular neural network processing architecture corresponds to claim 1iii.

iv. The processing circuit adapted to generate, as a function of the image signals generated by the photosensitive elements, at least one output signal indicating the deployment modalities of the airbag corresponds to claim 1iv.

v. At least one analog memory configured to store image data corresponding to the images generated by the photo sensitive elements corresponds to claim 6i.

vi. A control logic for executing real-time image processing sequences in said cellular neural network corresponds to claim 6ii.

vii. A circuit configured to store configuration parameters for the cellular neural network in digital form, the processing circuit further comprising a digital-analog converter for converting the parameters into analog format to be received by the cellular neural network corresponds to claim 8.

9. Claims 10-14 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breed et al in view of Kato (U.S. Patent No. 5,687,249).

Referring to claim 10, the processing circuit being configured to implement a combination operation of the processing results obtained in relation to at least two separate images of the passenger compartment is not explicitly explained by Breed et al. However, Kato explains performing a logical product between two image in order to determine the subject in an image in column 9, lines 24-32. By removing the background of the image, future processing of the subject in the system of Breed et al will be reduced, as the background will not be processed. The combination operation of Kato is performed on images of the exterior of a vehicle as illustrated in figure 1B, but can also be performed with the same processing on the images of the passenger compartment captures in the system of Breed et al. Therefore, it would have been

obvious to one of ordinary skill in the art at the time the invention was made to implement a combination operation of the processing results obtained in relation to at least two separate images of the passenger compartment, as suggested by Kato, in the system of Breed et al because the processing required to recognize and determine the motion of the subject will be reduced.

Referring to claim 11, the combination operation being a logical product corresponds to claim 10.

Referring to claim 12, the result of said combination operation identifying the output signal as indicative of the decision whether to deploy the associated airbag or not is explained by Breed et al in column 7, lines 38-43, wherein it is determined whether deployment of the side airbag should be suppressed.

Referring to claim 13, the result of said combination operation identifying said output signal as indicative of the control action of the deployment mechanism of the associated airbag is explained by Breed et al in column 7, lines 38-43, wherein the properties of airbag deployment are determined.

Referring to claim 14, at least two of said separate images comprise a substantially static image and a plurality of dynamic images of the passenger compartment is not explicitly explained by Breed et al. However, Kato illustrates a static or background image (73) and a dynamic or input image (72) in figure 15A. The combination operation of Kato is performed on images of the exterior of a vehicle as illustrated in figure 1B, but can also be performed with the same processing on the images of the passenger compartment captures in the system of Breed et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made for the two separate images to comprise a substantially static image and a

plurality of dynamic images of the passenger compartment, as suggested by Kato, in the system of Breed et al because the processing required to recognize and determine the motion of the subject will be reduced.

Referring to claim 19,

i. An array of photosensitive elements for acquiring images of a passenger compartment of a motor vehicle corresponds to claim 1i.

ii. A processing circuit coupled to the array of photosensitive elements and configured to receive signals generated by the photosensitive elements that correspond to images of the passenger compartment corresponds to claim 1ii.

iii. The processing circuit configured according to a cellular neural network processing architecture corresponds to claim 1iii.

iv. The processing circuit adapted to generate, as a function of the image signals generated by the photosensitive elements, at least one output signal indicating the deployment modalities of the airbag corresponds to claim 1iv.

v. The processing circuit is configured to carry out at least one of the following operations: thresholding, noise reduction by smoothing, cumulative difference calculating between images or ADI, contour imaging, noise reduction by small object deletion, contour closing, closed contour filling, diagonally connected contour imaging, and movement speed detection of an object in said images corresponds to claim 9.

vi. The processing circuit being configured to implement a combination operation of the processing results obtained in relation to at least two separate images of the passenger compartment generated by the array of photosensitive elements corresponds to claim 10.

10. Claims 15 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breed et al in view of Berenz et al (U.S. Patent No. 6,724,920 B1).

Referring to claim 15, a memory means for storing said images of the passenger compartment for later playback is not explicitly explained by Breed et al. However, Berenz et al explain storing a vehicle crash event in column 2, lines 37-41. Berenz et al explain recording images of a passenger compartment in column 3, lines 31-50. By recording information about a crash event, the cause of the crash and injuries sustained in the crash can be better evaluated. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to store images of the passenger compartment for later playback, as suggested by Berenz et al, in the system of Breed et al because the cause of the crash and injuries sustained by the passenger can be better evaluated.

Referring to claim 20,

i. An airbag is explained by Breed et al in the abstract.

ii. An array of photosensitive elements to be mounted in the passenger compartment and to acquire images of the passenger compartment and to generate therefrom signals corresponding to the images of the passenger compartment corresponds to claim 1i.

iii. A processing circuit coupled to the array of photosensitive elements, the processing circuit comprising a cellular neural network processing architecture configured to receive the image signals generated by the array of photosensitive elements and to generate therefrom at least one output indicating deployment modalities of the airbag corresponds to claim 1ii-1-iv.

iv. A memory circuit for storing images of the passenger compartment generated by the array of photosensitive elements for later playback corresponds to claim 15.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Arena et al (U.S. Patent App. Pub. No. 2002/0097900 A1) – To exhibit analyzing images captured using a cellular neural network implemented using CMOS technology as explained in the abstract.
- Chua et al (U.S. Patent No. 5,140,670) – To exhibit a cellular neural network to perform image processing as explained in the abstract.
- Kraft (U.S. Patent No. 6,099,030) – To exhibit determining the sitting position of a vehicle occupant with respect to an airbag as explained in the abstract.
- Krumm (U.S. Patent No. 5,983,147) – To exhibit determination to deploy an airbag by monitoring the passenger compartment of a vehicle as explained in the abstract.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hussein Akhavannik whose telephone number is (703)306-4049. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H. Boudreau can be reached on (703)305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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October 17, 2004

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